ENVIRONMENTAL Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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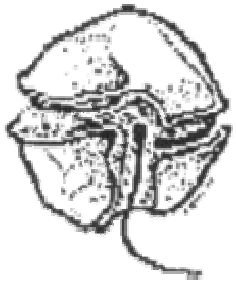
Red Tide in Coastal New Hampshire

What is Red Tide?
"Red tide" refers to a condition in which filter-feeding shellfish such as clams, oysters, and mussels accumulate a potent toxin produced by a naturally-occurring marine algae. The toxin affects the human central nervous system, and eating contaminated shellfish, whether raw or cooked, can be fatal. The term "red tide" is used to describe this condition because the intensity of some algal blooms can make the seawater appear red; however, dangerous blooms do not always discolor the water, nor do they actually have anything to do with the tides. In New Hampshire, red tide episodes can occur throughout the spring, summer and fall.

What Causes Red Tide?
Although there are several species of marine algae that can cause a variety of illnesses, the main illness of concern in New Hampshire coastal waters is paralytic shellfish poisoning, or PSP. Various species of *Alexandrium* (see diagram at right) cause PSP in the Gulf of Maine.

Off the coastlines of Maine, New Hampshire and Massachusetts, *Alexandrium* blooms typically occur in the spring and early summer, in response to increased sunlight and nutrients. Other water conditions such as low salinity and warmer temperatures, which often develop following springtime rains, snowmelt, and warmer air temperatures, are also associated with *Alexandrium* blooms. If water conditions are ideal, the *Alexandrium* cells reproduce, and growth is exponential – a single cell can result in the reproduction of several hundred cells in just a few weeks. If weather patterns move these offshore blooms closer to the shore, filter-feeding shellfish in recreational and commercial harvesting areas can accumulate dangerous levels of PSP toxin, making harvest closures necessary.



Alexandrium fundyense, the principal species of marine algae that causes PSP in coastal New Hampshire.

By the end of autumn, the *Alexandrium* cells settle in offshore ocean sediments in the form of cysts, where they lie dormant for the winter. The cycle repeats itself the following spring, when the cysts germinate into free-swimming, reproducing cells.

What are the Symptoms of Red Tide Poisoning?
If *Alexandrium* populations are high, filter-feeding shellfish can accumulate dangerous levels of PSP toxin in their tissues. Eating these shellfish, whether cooked or raw, can cause a life-threatening illness. The onset of symptoms is rapid, usually within two hours of consumption. Symptoms include tingling, burning, numbness, drowsiness, incoherent speech, and respiratory

paralysis, and can last a few days in non-lethal cases. Severe cases can result in death by respiratory arrest within 24 hours of consumption. There is no antidote for PSP, but supportive therapy and treatment is usually adequate, and survivors typically make a full recovery.

What Kinds of Shellfish Are Affected?
Bivalve shellfish such as clams, oysters and mussels can accumulate the toxin in their digestive system, because they filter microscopic food from the water. Whole scallops can also be toxic, but because the adductor muscle is typically the only part consumed, they are not considered a public health threat. Whelks and moon snails feeding on contaminated shellfish can be toxic. Shellfish such as lobsters, crabs and shrimp are not filter-feeders, and therefore do not accumulate the toxin in their meat. However, lobster tomalley can contain the PSP toxin, as well as other pollutants.

What Does DES Do to Protect Shellfish Consumers?
The most effective way to prevent PSP illnesses is by large-scale monitoring programs designed to assess toxin levels in mussels, oysters, and/or clams, and rapid closures of harvesting areas known or suspected to be toxic. PSP monitoring in New Hampshire has been ongoing for several years, typically consisting of weekly testing of blue mussels from Hampton/Seabrook Harbor and at the Isles of Shoals. Secondary sites and additional shellfish species are sampled as necessary. The testing occurs from April through the end of October, the period when the algae may be active. Data-sharing with Maine and Massachusetts has been an integral part of ensuring an adequate, large-scale monitoring program.


Because they accumulate PSP toxin so rapidly, blue mussels are the primary species used in DES's monitoring program.

How often are New Hampshire waters closed due to Red Tide?
New Hampshire shellfish waters are closed for harvesting when the PSP toxin levels in blue mussels reach the regulatory threshold of 80 micrograms of toxin per 100 grams of mussel tissue. Because PSP toxin levels can change very rapidly over the course of just a few days, waters may be closed for lower, but rising, amounts of toxin.

High levels of toxin and harvesting closures do not occur every year, but they do occur. One of the worst outbreaks of PSP in New England occurred in the spring/summer of 2005, causing widespread closures of recreational and commercial shellfish areas in Maine, New Hampshire and Massachusetts. Record levels of toxicity were measured at several New Hampshire monitoring stations, and many areas were closed for harvesting for most of May, June and July. A seven-month closure on the harvest of Atlantic surf clams was necessary because this species tends to retain the PSP toxin for a long period of time, often months after the algae bloom has subsided.

Harvesters should consult the “Clam Hotline” (1-800-43-CLAMS) frequently for updated information regarding the open/closed status of shellfish harvesting areas. For more information on shellfish harvesting in coastal New Hampshire, visit the DES Shellfish Program website at **http://des.nh.gov/wmb/shellfish**.